

REMARKS

The present invention relates to an acrylic pressure sensitive adhesive, a pressure sensitive adhesive tape, and a vehicular air conditioner unit.

In the Office Action of June 13, 2006, claims 6 and 12 - 16 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite, particularly with respect to the recitation "which is obtainable by using". Claims 1, 2, 4, 5, and 8 - 11 were rejected under 35 U.S.C. § 102(b) or alternatively under 35 U.S.C. § 103(a) based on JP 2002-69411 Abstract (JP '411). The same claims were rejected under 35 U.S.C. § 102(a) or (e) or alternatively under § 103(a) based on U.S. Patent 6,432,529 (Harder et al). Claims 3, 6, 7, and 12 - 16 were rejected under 35 U.S.C. § 103(a) based on either JP '411 or Harder et al. Claims 1, 2, 4, and 5 were rejected under 35 U.S.C. § 102(b) or alternatively under § 103(a) based on Barwich et al; and lastly, claims 3 and 6 - 16 were rejected under 35 U.S.C. § 103(a) based on Barwich et al.

In response to the Office Action, Applicants have herein amended claims 1, 2, 6, 12, 13, and 15 and have cancelled claims 3, 7, 9, 11, 14, and 16. To some extent, the recitations of canceled claims have been incorporated into the independent claims. The amendments to claims 1 and 2 are supported by the disclosure in the specification, e.g., at page 10, line 23 - page 11, line 4, and page 11, line 34 - page 12, line 20.

The amendments to claims 6, 12, 13, and 15 are responsive to the rejection under 35 U.S.C. § 112, with respect to the phrase "which is obtainable by using", the use of which has

been eliminated, based on which it is respectfully submitted that the claims are fully in compliance with the requirements of 35 U.S.C. § 112, and the rejection under 35 U.S.C. § 112 should now be withdrawn.

Below, Applicants set forth a detailed description of the present invention, in contrast, the present invention as presently claimed with the disclosure of the cited prior art references. Based thereon, it would be seen that the present invention as now claimed is neither anticipated nor obvious in view of the cited prior art.

Novelty and unobviousness of independent claims 1 and 2

First of all, Applicants note that it is important to the analysis of novelty and unobviousness, as a starting point, to consider the purpose of the invention. The acrylic pressure sensitive adhesive of the present application has strong adhesion and has essentially no odor even in the case that it is used in a closed space in housing, vehicles, and the inside of electronic appliances. In such applications, Applicants have established a specific evaluation method for assuring that odorless characteristics are satisfied, i.e., odor is at an insensible level even in the case that the adhesive is used in a closed space. Applicants have also provided concrete acrylic pressure sensitive adhesive satisfying this level of odorlessness.

There is prior art that describes an acrylic pressure sensitive adhesive that is suppressed in the amount of volatile components present. However, even in such a prior art, there has never

heretofore been described a concrete evaluation method for odorless characteristics that are satisfied to an insensible level even in the case that the adhesive is used in closed space.

A tackifier is necessary for strong adhesion. The influence of tackifier on odor has apparently never been studied. However, the present Applicants have firstly realized that, to achieve an insensible level of odor even in the case of use in closed space, it is necessary to consider not only the acrylic polymer but also the tackifier.

Technical features of present acrylic pressure sensitive adhesive include that the contains specific acrylic polymer and a tackifier. This is necessary for achieving the level of odorlessness required in accordance the presently claimed invention.

The acrylic polymer is polymerized with a polymerization initiator having a 10-hour half-life of 80°C or lower. The acrylic polymer is polymerized under a polymerizing condition carrying out the reaction while, keeping at the temperature higher than 10-hour half-life temperature and keeping the polymerization temperature T in the final stage of the polymerization in a range satisfying the conditions defined by the equation (5). By using the required polymerization initiator and polymerizing condition, no volatile component of the polymerization initiator or its residue remains in the acrylic polymer. In this regard, see page 9, lines 27 - 33 and page 10, line 23 to page 11, line 4 of the specification.

The tackifier contains 13% by weight or lower of a component with 600 or lower of molecular weight. By using the tackifier, the volatile component emitted from the tackifier can be suppressed without deteriorating the pressure sensitive adhesion physical properties. The pressure sensitive adhesion physical properties are actually improved, and an acrylic pressure sensitive adhesive with suppressed odor characteristics can be obtained. Furthermore, the volatile component to be released in the case of heating acrylic pressure sensitive adhesive to be obtained at 120°C for 30 minutes can be suppressed to 600 ppm or lower based on n-hexadecane, and the amount of the volatile component which is a high boiling point component difficult to remove by drying and which has 30 minutes or longer retention time can be suppressed to 50 ppm or lower. In this regard, see page 12, lines 5 - 17 of the specification. The method for removing the component with a molecular weight of 600 or lower from the above mentioned tackifier may include a method for heating and melting the tackifier at a softening point or higher, and a method for blowing steam. In this regard, see page 12, lines 30-34 of the specification.

The acrylic pressure sensitive adhesive of present application has strong adhesion and has an insensible level of odor even in the case it is used in a closed space. This distinguishing characteristic of the acrylic pressure sensitive adhesive of present application is demonstrated in the Examples of the specification. For instance, considering Examples 4 - 7 and Comparative Example 2, see the attached Table. The acrylic pressure sensitive adhesives of Examples 4 - 7 and Comparative Example 2 use the acrylic polymer polymerized with a polymerization initiator and under a polymerizing condition as described in claims. However the acrylic pressure

sensitive adhesives of Comparative Example 2, which used the tackifier contains 15.6% by weight of a component with 600 or lower of molecular weight, showed volatile component concentration A of 960 ppm, and show unsatisfactory odorous properties and clouding. The acrylic pressure sensitive adhesives of Example 4 and 6, which did not use any tackifier, show satisfactory odorous properties and clouding properties, but show unsatisfactory adhesion.

On the other hand, acrylic pressure sensitive adhesives of Examples 5 and 7, which use the tackifier contained therein at 9.4% by weight of a component with 600 or lower of molecular weight, show satisfactory properties with respect to odor, clouding and adhesion.

JP 2002-69411 Abstract discloses an acrylic pressure sensitive adhesive and accompanying adhesive tape product made from a high purity acrylic polymer. Harder et al discloses non-fogging acrylic pressure sensitive adhesive composition and tapes. Barwich et al teaches that polyacrylate melts suitable for use in pressure sensitive adhesive.

However none of the foregoing prior art relate to use of adhesive in a closed space. They have no disclosure of a specific evaluation method of odorless characteristic which is satisfied at an insensible level even in the case it is used in a closed space. Furthermore, they never disclose that it is necessary to consider not only the acrylic polymer but also the tackifier in order to achieve an insensible level of odor in the case that the adhesive is used in a closed space. JP 2002-69411 and Barwich et al only refers to tackifier as one of the additives of the adhesive.

Harder et al never refers to tackifier. Using the tackifier contains 13% by weight or lower of a component with 600 or lower of molecular weight is never disclosed in the cited documents.

Thus JP 2002-69411, Harder et al, and Barwich et al do not affect the novelty and unobviousness of the presently claimed invention.

In view of the above, reconsideration and allowance of pending claims 1, 2, 4 - 6, 8, 10, 12, 13, and 15 of this application are now believed to be in order, and such actions are hereby earnestly solicited.


If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the local Washington, D.C. telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.111
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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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TABLE

	acrylic polymer	tackifier
Example5	polymerized with a polymerization initiator and under a polymerizing condition described in claims	contains 9.4% by weight of a component with 600 or lower of molecular weight
Example7		contains 9.4% by weight of a component with 600 or lower of molecular weight
Example4		—
Example6		—
Comparative Example2		contains 15.6% by weight of a component with 600 or lower of molecular weight

	after 30 minutes at 90°C (ppm)					after 30 minutes at 120°C (ppm)			cloud	adhesion against peeling from SUS at 180°C (N/25mm)	
	pressure sensitive adhesive	pressure sensitive adhesive tape				pressure sensitive adhesive	pressure sensitive adhesive tape	odor			
		volatile component concentration on A	volatile component concentration on C	component content after 30 minutes or longer retention time	remaining polymerization initiator amount						total remaining monomer amount
Example5	330	220	33	14	11	357	238	2.7	O	17.2	
Example7	315	210	37	10	8	353	235	2.3	O	18.1	
Example4	98	65	15	15	10	105	70	2.5	O	9.7	
Example6	78	52	13	13	10	95	63	1.5	O	9.6	
Comparative Example2	960	640	478	14	10	1575	1050	5.0	Δ	16.5	